

Applicant : J. Richard Aylward  
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Amendments to the Claims:

This listing of claims replaces all prior versions and listings of claims in the application:

Listing of Claims:

1-2. (Canceled)

3. (Currently amended) A method for processing a single channel audio signal to provide a plurality of audio-channel signals, comprising:

separating said single channel audio signal into a first separated signal characterized by a spectral pattern generally characteristic of speech, and a second separated signal;

processing said first separated signal to provide a first audio-channel signal; and modifying said second separated signal to produce the remainder of said plurality of audio-channel signals, wherein said modifying includes:

dividing said second separated signal into a plurality of signals; and multiplying one of the latter signals by a predetermined factor, and wherein said factor is variable with respect to time.

4. (Currently amended) A method for processing a single channel audio signal to provide a plurality of audio-channel signals, comprising:

separating said single channel audio signal into a first separated signal characterized by a spectral pattern generally characteristic of speech, and a second separated signal;

processing said first separated signal to provide a first audio-channel signal; and modifying said second separated signal to produce the remainder of said plurality of audio-channel signals, wherein said modifying includes:

dividing said second separated signal into a plurality of signals; and

multiplying one of the latter signals by a predetermined factor, and wherein said factor applies a gain that is proportional to the time averaged magnitude of said first separated signal

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divided by the sum of the time averaged magnitude of said first separated signal and the time averaged magnitude of said second separated signal.

5. (Currently amended) A method for processing a single channel audio signal to provide a plurality of audio-channel signals, comprising:

separating said single channel audio signal into a first separated signal characterized by a spectral pattern generally characteristic of speech, and a second separated signal;

processing said first separated signal to provide a first audio-channel signal; and

modifying said second separated signal to produce the remainder of said plurality of audio-channel signals, wherein said modifying includes dividing said second separated signal into a plurality of signals; and

time-delaying said second separated signal.

6. (canceled)

7. (Currently amended) A method for processing a single channel audio signal to provide a plurality of audio-channel signals, comprising:

separating said single channel audio signal into a first separated signal characterized by a spectral pattern generally characteristic of speech, and a second separated signal;

processing said first separated signal to provide a first audio-channel signal; and

modifying said second separated signal to produce the remainder of said plurality of audio-channel signals, wherein said modifying step provides a left channel signal and a right channel signal, and wherein said modifying step further provides a left surround channel signal and a right surround channel signal.

8-14. (Canceled)

15. (Currently amended) An audio signal processing apparatus for processing a single-channel audio signal to provide a plurality of audio channel signals, comprising a separator, for separating said audio signal into a first separated signal characterized by a frequency spectrum characteristic of speech, and a second separated signal; and a first circuit coupled to said separator responsive to said second separated signal for providing a first subset of said plurality of audio channel signals, coupled to said separator, wherein said first circuit comprises multiple

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signal paths for said second separated signal, one of said multiple signal paths furnishing a time delay.

16. (Canceled)

17. (Currently amended) An audio signal processing apparatus for processing a single-channel audio signal to provide a plurality of audio channel signals, comprising a separator, for separating said audio signal into a first separated signal characterized by a frequency spectrum characteristic of speech, and a second separated signal;

and a first circuit coupled to said separator responsive to said second separated signal for, providing a first subset of said plurality of audio channel signals, coupled to said separator, wherein said first circuit comprises multiple signal paths, at least one of said multiple signal paths comprising a multiplier , and wherein said multiple signal paths are constructed and arranged to subtractively combine a signal to which variable gain has been applied with a signal path to which variable gain has not been applied.

18. (Canceled)

19. (Currently amended) An audio signal processing apparatus for processing a single-channel audio signal to provide a plurality of audio channel signals, comprising a separator, for separating said audio signal into a first separated signal characterized by a frequency spectrum characteristic of speech, and a second separated signal;

and a first circuit coupled to said separator responsive to said second separated signal for, providing a first subset of said plurality of audio channel signals, coupled to said separator, wherein said first subset of said plurality of audio channel signals comprises a left channel signal and a right channel signal , and wherein said first subset of said plurality of audio channel signals comprises a left surround channel signal and a right surround channel signal.

20-23. (Canceled)

24. (Original) An audio signal processing system comprising;  
an input terminal for a single input channel signal;  
a center channel output terminal for a center channel output signal C;

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a plurality of other output terminals, for a corresponding plurality of other output audio channel signals;

a separator for separating said single channel input signal into a speech audio signal and a nonspeech audio signal;

a first circuit coupling said speech audio signal to said center channel terminal, and

a second circuit, coupling said separator and said plurality of output terminals responsive to said nonspeech signal, providing a corresponding plurality of other audio channel signals.

25. (Original) An audio signal processing system in accordance with claim 24, wherein said second circuit comprises multiple signal paths,

one of said multiple signal paths furnishing a time delay.

26. (Previously amended) An audio signal processing system in accordance with claim 24, wherein said second circuit comprises multiple signal paths,

at least one of said multiple signal paths comprising a multiplier.

27. (Original) An audio signal processing system in accordance with claim 26, wherein said multiplier is coupled to an other output terminal that is a left channel output terminal.

28. (Original) An audio signal processing system in accordance with claim 26, wherein said multiplier is coupled to an other output terminal that is a right channel output terminal.

29. (Original) An audio signal processing system in accordance with claim 24, wherein said separator comprises a band pass filter having a pass band corresponding substantially to the spectrum of speech signals.

30. (Original) An audio signal processing system in accordance with claim 24, further comprising a multiplier coupling said separator to said center channel output terminal and multiplying the output of said separator by a predetermined factor.

31. (Original) An audio signal processing system in accordance with claim 30, wherein said predetermined factor is variable with respect to time.

32. (Original) An audio signal processing system in accordance with claim 30 wherein said predetermined factor is proportional to the time averaged magnitude of said speech audio signal.

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33. (Original) An audio signal processing system in accordance with claim 32 wherein said predetermined factor is proportional to the time averaged magnitude of said speech audio signal divided by the sum of the time averaged magnitude of the speech audio signal and the time averaged magnitude of said nonspeech audio signal.

34. (Original) An audio signal processing system in accordance with claim 24, wherein said second circuit provides a left channel signal L, a right channel signal R, a left surround channel signal Ls, and a right surround channel signal RS,

further comprising a downmixing circuit coupled to said plurality of other output terminals and to said center channel output terminal, for downmixing said plurality of other output audio channel signals and said center channel signal to provide a plurality of decodable audio channel signals.

35. (Original) An audio signal processing apparatus in accordance with claim 34, wherein said plurality of decodable audio channel signals consists of two decodable audio channel signals.

36. (Original) An audio signal processing apparatus in accordance with claim 34, wherein said plurality of decodable audio channel signals consists of three decodable audio channel signals.

37-39. (Canceled)

40. (Previously amended) A method for processing a single channel audio signal to provide three decodable audio channel signals subsequently decodable into five audio channel signals, comprising:

separating said single channel audio signal into a first separated signal characterized by a spectral pattern generally characteristic of speech, and a second separated signal;

processing said first separated signal to form a center channel signal comprising a first decodable audio signal;

processing said second separated signal to provide a left channel signal, a right channel signal, a left surround channel signal, and a right surround channel signal;

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combining a sum of said left surround and said right surround channel signals with said left channel signal to produce a second of said decodable audio channel signals;

and combining said sum of said left surround with said right surround channel signals, and said right channel signal to produce a third of said decodable audio channel signals.

41. (Original) A method for processing a single channel audio signal in accordance with claim 40, further comprising scaling by a predetermined surround factor.

42. (Original) A method for processing a single channel audio signal in accordance with claim 41 further comprising reversing the phase of one of said sum comprising one of said second and third decodable audio signals relative to the other of and said second and third decodable audio signals.

43-48. (Canceled)